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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/880,754	06/15/2001	Hans Jurgen Matt	Q64847	5933

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EXAMINER

SINGH, RAMNANDAN P

ART UNIT PAPER NUMBER

2644

DATE MAILED: 03/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/880,754

Applicant(s)

MATT ET AL.

Examiner

Ramnandan Singh

Art Unit

2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 and 15-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 11-14 and 18-20 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 June 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>(i) June 15, 2001; (ii) Sept. 08, 2003</u> . | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**  
**Election/Restrictions**

1. This application filed on 15 June 2001 contains claims directed to the following patentably distinct species of the claimed invention:

LEVEL-I:

Species I: Claims 4, 6, 7, 10 are directed to a  $k(S/N)$  function.

Species II: Claims 4, 6, 7, 10 are directed to a  $k' (N/S)$  function.

Species III: Claims 4, 6, 7, 10 are directed to a  $k'' (N/N+S)$  function.

Species IV: Claims 18, 19, 20 are directed to artificial noise

LEVEL-II:

Sub-Species I: Claims 2, 9, 10 are directed to a linear relationship.

Sub-Species II: Claims 11-12 are directed to a polynomial ( bell-shaped curve).

Sub-Species III: Claims 13-14 are directed to psychoacoustic mean values.

2. Applicant is required under 35 U.S.C. 121 to elect a single disclosed species from LEVEL-I for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable; if any of species I, II, or III is chosen, one of LEVEL -II must also be chosen. Currently, claim 1 is generic and comprises a function  $h(N)$ .

3. Applicant's response filed on August 24, 2004 confirmed the election of Species III from level I and the election of the Sub-Species I from Level II. As a result, claims 11-14 and 18-20 are non-elected by the Applicant. Thus, claims 1-10 and 15-17 are pending for consideration. Hence, this restriction requirement is made FINAL.

### ***Drawings***

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims.

Claim 1 recites the limitations "the power value of the noise level N in the currently used telecommunications channel is continuously measured and/or estimated" on page 1, lines 11-14. "The measuring and/ estimating noise level N" is not shown.

Claim 17 recites the limitation "the reduction of noise signals and the reduction of echo signals are **controlled separately**" on page 4, lines 13-15. This feature is not shown.

The features characterizing (i) "measurement and/or estimation of the noise level N", and (ii) controlling echo reduction and noise reduction separately are NOT shown. Therefore, the above features must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Priority***

5. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy of the application in German has been received on 15 October 2001.

***Oath/Declaration***

6. The revised oath or declaration filed on August 24, 2001 is approved.

***Specification***

7. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

**Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.

(b) CROSS-REFERENCE TO RELATED APPLICATIONS.

(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.

(d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)

(e) BACKGROUND OF THE INVENTION.

(1) Field of the Invention.

(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.

(f) BRIEF SUMMARY OF THE INVENTION.

(g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).

(h) DETAILED DESCRIPTION OF THE INVENTION.

(i) CLAIM OR CLAIMS (commencing on a separate sheet).

(j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

(k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825.

8. The abstract of the disclosure is objected to because it contains more than 150 words. Correction is required. See MPEP § 608.01(b).

***Claim Rejections - 35 USC § 112***

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 1, 3, 4, 6-10, and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claim 1 recites the limitation "the noise level N" in line 12. There is insufficient antecedent basis for this limitation in the claim.

Also, claim 1 recites the limitation "the currently used telecommunication channel" in lines 12-13. There is insufficient antecedent basis for this limitation in the claim.

In addition, claim 1 recites the limitation "the currently noise level N" in line 17. There is insufficient antecedent basis for this limitation in the claim.

b. Claim 4 recites the limitation "the signal-to- noise ration" in line 1. There is insufficient antecedent basis for this limitation in the claim.

c. Claim 16 recites the limitation "the signal " in line 9. There is insufficient antecedent basis for this limitation in the claim.

Also, claim 16 recites the limitation "the speech pauses" in line 10. There is insufficient antecedent basis for this limitation in the claim.

d. Claim 3 recites the limitation "preferably  $-45 \text{ dB} \leq h_{\min} \leq -35 \text{ dB}$ ". The word "preferably" is vague and indefinite. A similar thing holds for claims 4, and 6-10.

e. Claim 9 recites the limitation "at least partially" in line 2. The word "partially" is indefinite. A similar thing holds for claim 10.

### ***Claim Rejections - 35 USC § 102***

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1, 5, 15 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Walker et al [US 5,570,423].

Regarding claim 1, Walker et al teach a method of providing adaptive echo cancellation using an echo canceller in a hands-free speaking system, as shown in Figs. 1-3, wherein the echo canceller includes a Finite Impulse response (FIR) filter (5) [ See Fig. 3]. The echo canceller applies a well-known Normalized Least-Mean Squares (NLMS) algorithm for combination of noise reduction and echo cancellation [col. 1, lines 34-39]. Further, the values of the FIR filter coefficients are automatically dynamically

scaled wherein a step width ( $\sigma$ ) introduced in the NLMS algorithm is controlled in dependence upon the ambient conditions of a signal source and a signal sink at the near-end of the transmission system, upon disturbance variables superimposed on the useful signal, and upon efficiency of the echo canceller [col. 2, lines 43 to col. 3, line 4]. Equation 1 presents a standard NLMS algorithm wherein the step width ( $\sigma$ ) is a measure of the change of the filter coefficients  $C_1$  to  $C_N$  after a new calculation [col. 4, line 60 to col. 5, line 30]. Further, a predefined function  $h(N)$  (i.e. the step width ( $\sigma$ )) depends upon the current noise level  $N$  (i.e. **estimated noise level, Inoise**) [see Equation 6], wherein  $Inoise$  is estimated [Fig. 8B] using a circuit arrangement of a local noise level estimator [see Figs. 6-8B; col. 8. lines 29-51; col. 12, lines 22-28].

Regarding claim 5, Walker further teach using the method for reducing echo signals, wherein noise signals are also reduced [col. 12, lines 22-28].

Regarding claim 15, Walker further teach the method for detecting a speech pause for recognition of the noise level  $N$  col. 5, lines 31-37].

Regarding claim 17, Walker further teach using the method for canceling echoes that applies a Normalized Least-Mean Squares (NLMS) algorithm for combination of noise reduction and echo cancellation wherein the reduction of noise signals and the reduction of echo signals are controlled separately [Fig. 8B; col. 1, lines 34-39; col. 12, lines 22-28].

***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 4, 6-8, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walker et al as applied to claims 1 and 5 above, and further in view of Shanmugam ["Digital and Analog Communication Systems" (Book), 1979, John Wiley & Sons, PP. 175-181].

Regarding claim 4, the function  $h(N)$  (i.e. step width) is a function  $k'(N/S)$  which depends on  $N/(N+S)$  as claimed. This basically implies taking into consideration the telecommunication channel capacity. Although Walk et al teach taking into account the noise during echo cancellation, they do not teach expressly considering the telecommunication channel capacity for echo cancellation and noise reduction.

Shanmugam teaches the famous Shannon-Hartley theorem defining the capacity of a telecommunication channel as a function  $k'(N/S)$  which depends on  $N/(N+S)$ , wherein  $S$  and  $N$  are average signal power and noise power.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the predefined function  $h(N)$  as a function of  $N/(N+S)$  of Shanmugam with Walker et al in order to take into account the capacity of a telecommunication channel for echo cancellation and noise reduction.

Claim 6 is essentially similar to claim 4 and is rejected for the reasons stated above.

Regarding claim 7, since Walker et al and Shanmugam do not teach expressly specific ranges of noise levels as claimed in claim 7, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to use any range of the noise level in order to accommodate the specified performance of the echo canceller and that of the noise reduction controller of the telecommunication channel subject to circuit, system, and design constraints.

Regarding claims 8 and 10, the limitations are shown above.

15. Claims 2-3 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walker et al as applied to claim 1 above.

Regarding claim 2, since Walker et al do not teach expressly specific ranges of noise levels as claimed in claim 2, it would have been obvious to one of ordinary skill in the art , at the time the invention was made, to use any range of the noise level in order to accommodate the specified performance of the echo canceller and that of the noise reduction controller of the telecommunication channel subject to circuit, system, and design constraints.

Regarding claims 3 and 9, the limitations are shown above.

16. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Walker et al as applied to claim 15 above, and further in view of Romesburg [US 6, 148,078].

Regarding claim 15, Walker et al do not teach expressly applying an exponential decay function to reduce the power of the signal during the speech pauses.

Romesburg teaches applying an exponential decay function to reduce the power of the signal during the speech pauses [col. 33, lines 5-15; col. 28, line 50 to col. 29, line 21].

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the exponential function of Romesburg with Walker et al in order to reduce the power value of the signal to be transmitted during the speech pauses so

that the effect of coefficient adaptation of the adaptive filter of Walker et al during the speech pauses is minimized [Walker et al; col. 5, lines 31-37].

### ***Conclusion***

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

(i) Takada et al [US 6,236,725 B1] teach an echo canceller employing multiple step gains (i.e. step sizes) based on different local background noise levels [Figa.1-6col. 9, line 21 to col. 10, line 67].

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ramnandan Singh whose telephone number is (703)308-6270. The examiner can normally be reached on M-F(8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tran Sinh can be reached on (703)-305-4040. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2644

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ramnandan Singh  
Examiner  
Art Unit 2644



  
**SINH TRAN**  
**SUPERVISORY PATENT EXAMINER**